



PATENT
Case 1060 #4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Terrell Neils Andersen,)
Samuel Faust Burkhardt,)
Wilmont Frederick Howard, Jr.,)
Richard F. Wohletz,)
Vahid Kazerooni,)
Mohammad Reza Moumenzadeh) Art Unit: 1741
and Amy Wren Unsell)
Serial No.: 09/217,168)
Filed: December 21, 1998) Examiner: Unknown
For: HIGH DISCHARGE CAPACITY)
ELECTROLYTIC MANGANESE)
DIOXIDE AND METHODS OF)
PRODUCING THE SAME)

INFORMATION DISCLOSURE STATEMENT

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

SIR:

The following prior art is known to Applicants or Applicants' attorneys and is submitted for the Examiner to consider in the above-captioned application.

U.S. PATENTS

U.S. Patent No. 3,855,088 issued on December 17, 1974 to Tetsuji Kosaka.

U.S. Patent No. 3,900,385 issued on August 19, 1975 to Akio Era et al.

U.S. Patent No. 4,069,116 issued on January 17, 1978 to Levan Nikolaevich Dzhaparidze et al.

U.S. Patent No. 4,477,320 issued October 16, 1984 to Olen L. Riggs, Jr.

U.S. Patent No. 4,483,828 issued November 20, 1984 to William C. Laughlin et al.

U.S. Patent No. 4,485,073 issued November 27, 1984 to Wilbert J. Robertson et al.

U.S. Patent No. 4,489,043 issued December 18, 1984 to Paul D. Bowerman et al.

U.S. Patent No. 4,606,804 issued August 19, 1986 to Dwight A. Schulke et al.

U.S. Patent No. 4,744,878 issued May 17, 1988 to Olen L. Riggs, Jr.

U.S. Patent No. 5,489,493 issued February 6, 1996 to Lewis F. Urry.

U.S. Patent No. 5,746,902 issued May 5, 1998 to Hisao Takehara et al.

OTHER PUBLICATIONS

Text literature from Chapter 3 entitled Electrochemistry of Manganese Dioxide and Production and Properties of Electrolytic Manganese Dioxide (EMD) by A. Kozawa published in *Batteries*, Vol. 1 (1974).

Publication entitled How the Solid State Properties of Electrodeposited Manganese Dioxide Correlate With the Conditions of its Deposition by E. Preisler published in *The 2nd Battery Material Symposium (The 3rd MnO₂ Symposium)*, Vol. 2, Graz, pp. 247-266 (1985).

Publication entitled Electrochemical Procedure in Electrical Generation, Electrical Storage and Electrical Distribution by E. Preisler et al. published in *DECHEMA Monogr.*, 109, pp. 123-137 (1987).

Publication entitled Material Problems Encountered in Anodic MnO₂ Deposition by E. Preisler published in *Journal of Applied Electrochemistry*, Vol. 19, pp. 559-565 (1989).

Publication entitled Pilot Plant Studies for the Production of Electrolytic Manganese Dioxide and Manganese Metal by P. Sen Gupta published in *Proceedings of the International Symposium on Electrometallurgical Plant Practice*, pp. 141-161 (1990).

Publication entitled Alkaline Discharge Testing of EMD Samples in Plastic Cells by S.F. Burkhardt published in *Progress in Batteries & Battery Materials*, Vol. 11, IBA Sydney, Australia Meeting, pp. 136-149 (1992).

Publication entitled Effect of Some EMD Structural Features on Alkaline Discharge Capacity by T.N. Andersen published in *Progress in Batteries & Battery Materials*, Vol. 11, IBA Sydney, Australia Meeting, pp. 105-129 (1992).

Publication entitled The Influence of Potassium Ion on the Electrodeposition and Electrochemistry of Electrolytic Manganese Dioxide by W-H. Kao et al. published in *Journal of the Electrochemical Society*, Vol. 139, No. 5, May, 1992, pp. 1223-1226.

Publication entitled Electrolytic Manganese Dioxide Quality Management, A Case Study by R.F. Wohletz et al. published in *Proceedings of the Symposium on Quality Management in Industrial*

Electrochemistry by The Electrochemical Society, Inc., Proceedings Vol. 93-19, pp. 49-59 (1993).

Publication entitled Effect of Deposition Conditions on the Structural, Chemical, Physical and Electrochemical Properties of EMD by R. Williams et al. published in *Progress in Battery & Battery Materials*, Vol. 13, pp. 102-112 (1994).

Publication entitled High Drain Discharge Performance of EMD by R.P. Williams et al. published in *Progress in Batteries & Battery Materials*, Vol. 15, pp. 48-56 (1996).

Ph.D. thesis entitled The Effect of Operating Parameters on the Properties of Electrolytic Manganese Dioxide by M. Mauthoor, University of the Witwatersrand, Johannesburg, South Africa (1995).

Copies of the aforementioned references and Form PTO-1449 are submitted herewith.

Respectfully submitted,

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